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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,596	09/25/2006	Susumu Noda	46311.1	1380
66416 7590 11/05/2008 JAPAN SCIENCE AND TECHNOLOGY AGENCY c/o KEATING & BENNETT, LLP 1800 Alexander Bell Drive SUITE 200 Reston, VA 20191				
EXAMINER BELOUSOV, ALEXANDER				
ART UNIT 2894		PAPER NUMBER		
MAIL DATE 11/05/2008		DELIVERY MODE PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,596

Applicant(s)

NODA ET AL.

Examiner

ALEXANDER BELOUSOV

Art Unit

2894

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-13 is/are pending in the application.
- 4a) Of the above claim(s) 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9 and 11-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date: _____

DETAILED ACTION

1. This Office Action is in response to the amendment filed on 07/15/2008. Currently, claims 9 & 11-13 are pending.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim(s) 11 & 13** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim limitations of “at least one medium defining each of the lattice points includes at least two media”, as recited in claim(s) 11 & 13 and the claim limitations of “base medium”, as recited in claim(s) 9 & 12, are unclear as to what the Applicant claims. The claim limitations mean that there are at least 3 media. However, from the Applicant’s FIG. 1 (the elected embodiment) and FIG. 25 (Prior Art that shows the entire device) it is unclear what are the three media to which the Applicant refers. Only two elements can be seen (FIG. 1; 12 & 21). Therefore, the claims are cited as indefinite. If it is a case of the drawings simply not showing that feature, then the corrected drawings are required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claim(s) 9 & 11-13** are rejected under 35 U.S.C. 102(b) as being anticipated by (US-2002/0127565) by Cunningham et al ("Cunningham").

Regarding claims 9 & 12, Cunningham discloses in FIG. 1A and related text, e.g., a two-dimensional photonic crystal (portion above $n_{\text{SUBSTRATE}}$; Cunningham calls it "two-dimensional grating") comprising:

a photonic crystal which has a photonic crystal periodic structure located in or near an active layer (see paragraph 11; optical device is a cover layer on the photonic crystal) which emits light when carriers are injected thereto, said photonic crystal periodic structure including a base medium (portion of "crystal" that is above the rectangle with " n_2 " marking) and at least one medium defining lattice points (the rectangle with " n_2 " marking and portion directly to the side of it), the base medium and the at least one medium having different refractive indices (" n_2 " and " n_1 ") in a two-dimensional periodic array (see FIG. 3A); wherein

said photonic crystal period structure is a substantially square lattice structure or a substantially rectangular lattice structure (see FIG. 3A; it is square lattice structure);

the lattice points are substantially triangular lattice points (FIG. 3A shows squares as an example; paragraph 12 clearly states that it can be triangles); and

said photonic crystal period structure is classified into p1, pm, pg or cm by a classification method under IUC (International Union of Crystallography in 1952) (inherently a "p1, pm, pg or cm" lattice structure by Applicant's admission; on pages 17 & 18 of the specification Applicant admits that the lattice structure of the type described by Cunningham in FIG. 3A, with the triangles instead of squares is a p1, pm, pg or cm lattice structure).

The recitation of “surface-emitting laser” has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Regarding claims 11 & 13, Cunningham discloses in FIG. 1A and related text, **e.g.**, the at least one medium defining each of the lattice points includes at least two media (the rectangle with “n₂” marking and portion directly to the side of it) having different refractive indices (“n₂” and “n₁”) or a medium with a refractive index distribution.

4. **Claim(s) 9 & 11-13** are rejected under 35 U.S.C. 102(e) as being anticipated by (US-2003/0235229) by Deng et al (“Deng”).

Regarding claims 9 & 12, Deng discloses in FIG. 1A and related text, **e.g.**, a two-dimensional photonic crystal surface-emitting laser (see Title) comprising:

a photonic crystal (see FIG. 3, 310) which has a photonic crystal periodic structure located in or near an active layer (see FIG. 2, 302) which emits light when carriers are injected thereto, said photonic crystal periodic structure including a base medium (see paragraph 29; the “lattice points” 104 can go into other layers; so, “base medium” is FIG. 3, 314, since it can also contain the “lattice points”) and at least one medium defining lattice points (FIG. 1A, 100), the base medium and the at least one medium having different refractive indices (inherent; different

materials means different refractive indexes) in a two-dimensional periodic array (see FIG. 1A); wherein

said photonic crystal period structure is a substantially square lattice structure or a substantially rectangular lattice structure (105);

the lattice points are substantially triangular lattice points (see FIG. 1B, 107; Deng says that these are freely interchangeable); and

said photonic crystal period structure is classified into p1, pm, pg or cm by a classification method under IUC (International Union of Crystallography in 1952) (inherently a “p1, pm, pg or cm” lattice structure by Applicant’s admission; on pages 17 & 18 of the specification Applicant admits that the lattice structure of the type described by Deng in FIG. 1A, with the triangles of FIG. 1B instead of squares is a p1, pm, pg or cm lattice structure).

Regarding claims 11 & 13, Deng discloses in FIG. 1A and related text, e.g., the at least one medium defining each of the lattice points includes at least two media (100 has at least two materials) having different refractive indices (inherent; different materials means different refractive indexes) or a medium with a refractive index distribution.

Response to Arguments

1. Applicant’s arguments with respect to claims 9 & 11-13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Belousov whose telephone number is 571-270-3209. The examiner can normally be reached on Monday - Thursday 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Nguyen can be reached on 571-272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Alexander Belousov/
Examiner, Art Unit 2894
10/30/2008

/Kimberly D Nguyen/
Supervisory Patent Examiner, Art Unit 2894